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well as their nuclei, does not prove that they were not subsequently polished. I shall, therefore, say here no more of the many flint implements found in different spots, partly on the surface, or in the vegetable earth, or in sand and gravel beds. Further observation may, perhaps, by the addition of other more positive characters, assign to them a definite place in history ; but, until such characters are found, we should take all these finds *ad referendum*, and rather confess our ignorance, than enter into discussion on subjects which as yet have acquired no scientific certainty.

[*To be continued.*]

THE FOSSIL HUMAN JAW FROM SUFFOLK.

BY ROBERT H. COLLYER, M.D.

At the instigation of Vice-Admiral Sir Edward Belcher, C.B., I was induced to exhibit to the Ethnological Society of London in April 1863, a fossil or coprolite human jaw, which was found by the workers employed in excavating coprolites near Ipswich, Suffolk.

The jaw was purchased from the finder by Mr. John Taylor, druggist, of Ipswich, for the sum of 2s. 6d., who called my attention to it at the time, 1855. A small portion of the bone was filed off, which, on the application of heat, emitted a slight odour peculiar to burnt gelatine, showing conclusively that the whole of the animal matters of the bone had not been fossilised. As this, to my mind, is no criterion that the bone did not belong to a period coeval with extinct mammals, I was very anxious to become the possessor of this "coprolite jaw." The specific gravity is much greater than that of a recent bone of the like size, it being infiltrated throughout its entirety with oxide of iron, and the surface presents peculiar metallic lustre. The condyloid processes are one-and-half inches distant from the alæ, and from the condyles to the posterior angular protuberance it recedes full 45°, and the same receding angle is shown from the mentum prominens to the alveolar processes of the place formerly occupied by the incisor teeth ; the bone probably was that of a female of small stature, and as the alveolar portion of the jaw, where the incisor teeth were inserted, is closed, and the molar teeth ground down, I am of opinion that "the human" tore the food prior to mastication by the molars. The cranium of this jaw must have been very small, with a contracted low frontal region. I have now every reason to believe that this "coprolite jaw" is the oldest relic of the human animal in existence, as its

condition corresponds in every respect with the coprolites in whose contact it was found. Mr. Taylor presented the "coprolite jaw" to Sir Thomas Beaver, Bart., of Norfolk, in whose possession it remained until March 1857, when he kindly forwarded it to me. I took it forthwith to my friend Professor Quekett, who was then curator of the College of Surgeons, who after having carefully examined it, said, "this is, indeed, a curious bone ; it belonged to a very low race ; I would wish Mr. Owen, of the British Museum, to see it." I accordingly took it to Professor Owen, who kept it for two years without coming to any *expressed* opinion. In 1859 I took it to Mr. Prestwich.

In April 1863, in consequence of Sir Charles Lyell's work "On the Antiquity of Man," I wrote to Professor Huxley a short history of the "coprolite jaw." In the meantime Sir E. Belcher called on me, stating that Mr. Crawford was going to read a paper on "the primitive races of mankind" at the Ethnological Society, and urged me to accompany him, and bring the "coprolite jaw."

After the paper, a discussion took place, in which Sir C. Lyell, Sir Roderick Murchison, and Professor Busk took part. At this time the whole scientific world was very much interested in the discovery of the "Abbeville jaw" by M. Boucher de Perthes in the drift of the Somme Valley, in contact with flint haches or langues de chats.

Professor Busk, whom I had not the pleasure of knowing at the time, pronounced the "coprolite jaw" in the most summary manner to be "the jaw of some old woman, perhaps from some Roman burial ground," and also said that the "Abbeville jaw" had been proved to be a deception practised by the workmen on M. Boucher de Perthes. Everyone present at this juncture looked on me as an impostor or a fool for having had the rank temerity to have dared to foster on such authorities and experts "my jaw," without prestige or unheralded by fame. I, however, said mentally, this "old woman's jaw" shall "be heard;" but to vindicate the facts at that moment was out of the question. The tide had turned against me. I enjoyed a private laugh at the perversity of even the highest apostles of the science of geology, hitherto proscribed by the bigotted and intolerant. I was conscious of the genuineness of the "coprolite jaw."

Next morning Professor Huxley called at my house and pronounced the "coprolite jaw" to be a "most extraordinary specimen." I gave it to him, so that a careful examination should be made, and received the following :—

"Royal School of Mines, Jermyn Street, May 2, 1863.

"MY DEAR SIR,—My friend Mr. Busk has taken your remarkable specimen in hand, and I will ask him to inform you as to the conclusions to which he may arrive. No doubt, as I stated when you were

so good as to show me the jaw, it has some peculiar characters, but they do not appear to me in themselves adequate to lead me to ascribe the bone to an extinct or aberrant race of mankind, and the condition of the bone is not such as I should expect a crag fossil to be.

"I am, dear Sir, faithfully yours,

"T. H. HUXLEY.

"Dr. Collyer."

The "Abbeville jaw" controversy enlisted at this moment all the most eminent anthropologists of Europe. The principal disputants were, in England, Messrs. Hugh Falconer, Busk, Prestwich, and Evans; in France, MM. Quatrefages, Delesse, Desnoyers, Lartet, Gaudry, Lyman, Pictet, and Boucher de Perthes. Messrs. Prestwich and Evans undertook to show that the flint implements were of modern fabrication. Messrs. Falconer and Busk, that the "Abbeville jaw" contained so large a proportion of animal matter, as to pronounce the bone to be comparatively modern when compared with *the drift* with which it was alleged to have been found.

The "coprolite jaw" was considered, both by Drs. Falconer and Busk, to be of sufficient importance to be taken by them to Paris, so as to show the French savans that a human jaw favourably situated could be infiltrated with a metallic substance; and in the reprint of a pamphlet from the *Natural History Review*, July 1863:—

"An account of the proceedings of the late Conference held in France to inquire into the circumstances attendant on the asserted discovery of a human jaw in the gravel at Moulin Quignon near Abbeville, with notes by H. Falconer, M.D.; George Busk, F.R.S.; W. B. Carpenter, M.D., Vice-President of the Royal Society."

At note 37, in referring to the "coprolite jaw," I find these words:—

"The specimen is a very remarkable lower jaw of a human subject now belonging to Dr. Robert H. Collyer. It is reputed to have been found in the gravel heap of a coprolite pit near Ipswich; although retaining a portion of its gelatine, it is infiltrated through and through with iron. The Haversian cords are filled with red oxide, and a section of the fang shows that the ivory is partly infiltrated with the same metal. This specimen proves that the human jaw, if favourably placed, is equally susceptible of impregnation with metallic matter as the bones of any other mammal.

"(Signed)

"H. FALCONER,

"G. BUSK."

The term fossil has been used to designate a total conversion of a substance into mineral matter. Now, it is exactly in the correct use of this word that the whole question rests. I have in my possession the bone of a deer, which was found in the diluvium on the bare rock, twenty-three feet below the surface, with the bones of the mastodon,

but the presence of gelatine is at once discovered on submitting a portion of the bone to the action of fire ; it is, therefore, not an infallible test as to the presumed age of a bone that it contains or not a portion of its gelatine.

It now appears that the preservation of the gelatine itself, or its destruction, depends in a great measure in accordance with the earthy or metallic matter with which the bone happens to be in contact. I have found portions of the same bone perfectly fossilised, whilst other parts indicated the presence of gelatine. It is now admitted, as the result of experiment, that bones of recent animals, introduced into old deposits, may assume in a comparative short time the conditions of the bone of extinct animals ; while on the other hand, the undoubted fossil bones of extinct animals, may, under certain conditions, present a large amount of animal matter. In the Museum of Natural History, Philadelphia, the bones of the megalonyx and the extinct peccary remain in a condition nearly unchanged. Very little of the gelatine has been lost, nor a particle of the mineral matter added.

Many of the human bones found by Dr. Lund in the ossiferous caves of Brazil were petrified in the same manner, and offered the same metallic break, and were penetrated with the same ferruginous matter as the bones of extinct animals with which they were found associated. The same as the "coprolite jaw" was impregnated, like the coprolites, with which it was found. Sir C. Lyell says, in his *Elements of Geology*, 1852 :—

"The large amount of animal matter in the tusks, teeth, and bones of some of these fossil mammalia is truly astonishing ; it amounts, in some cases, as Dr. Jackson has ascertained by analysis, to be 27 per cent., so that when all the earthy ingredients are removed by acids the form of the bone remains perfect, and the mass of animal matter is almost as firm as a recent bone subjected to similar treatment."

Who would infer, because of the existence of the animal matter, that the bones had been recently buried or were comparatively modern ? "These fossil mammalia" inhabited the earth's surface coeval with a human being whose type was suited to the then state of things. Prior to the last great convulsion or catastrophe which entirely removed all life, the gelatine in the bones of the extinct mastodon, megatherium, megalonyx, glyptodon, or mylodon, is not adduced as an argument that these bones are of recent date, therefore, why should it be made use of when applied to the human bone ?

Is the structure of one bone in any wise different from the other, whether of the mastodon or of a man, that, under like conditions, it would not present the like infiltration of metallic matter entirely or in part ? It occurs to me that, when the difference is made, the disputant is sacrificing science to preconceived notions and prejudices.

M. Quatrefages says :—

“The presence of gelatine, if I am not mistaken, has been demonstrated in various bones, properly so-called belonging to fossils, much more ancient than the diluvium can be by any possibility.”

It is only within a few years that the bones of a fossil monkey were discovered.

Sir C. Lyell says :—

“At Kyson, a few miles east of Woodbridge, a bed of eocene clay twelve feet thick underlies the red crag. Beneath it is a deposit of yellow and white sand of considerable interest in consequence of many peculiar fossils contained in it. Its geological position is probably the lowest part of the London clay proper. In this sand has been found the *first example* of a fossil quadrumanous animal discovered in Great Britain, namely the teeth and part of a jaw, shown by Mr. Owen to belong to a monkey of the genus *Macacus*. It was not until 1836 that the existence of any fossil quadrumana had been brought to light.”*

Now comes the mental struggle—the monkey having been found as existing at a prior condition to that which now exists of the earth—why should not man?

The question is severe, but must be put. What are the conditions which admit of the monkey and mammals enjoying life that would not also equally admit of man being an inhabitant of the earth at a corresponding period?

Perhaps man, in his highest order of development, could not then have flourished; it is easy to understand a state of the earth congenial to purely animal existence, though not fitted to mental functions as we now manifest them.

M. Pictet says, with regard to fossil man :—

“The question may be put—At what period has man appeared upon the earth? What was the geological state of the surface of the earth? What animals lived at that period?”

A precise answer to these questions would be all that could be desired. We cannot arrive at that point, though we are much nearer than we appeared some years ago. When the earth was sufficiently cooled vegetation was produced on the emerged continents, after which the first zoological creation took place, and animals, differing from most of those which now exist, spread over the face of the earth.

Elevations and depressions modified the surface of the earth, and either by convulsions similar to those which had occasioned them, or by organic laws governing the world and not yet understood, the beings then living disappeared to be replaced by others. These phenomena,

* Prof. Owen has since admitted this “monkey” to be actually a small pachyderm, allied to the pig (*Hyracotherium*).—EDITOR.

or something like them, have occurred repeatedly, and thus numerous populations have succeeded each other. Each of these has left its remains or vestiges in strata formed at different periods. These remains are "the medals of creation," which, with data furnished by geology, enable us to read the past history of the globe—the existence of at least thirty different epochs, more or less distinct, and in each we recognise a different *Flora* or *Fauna*. The most vivid imagination cannot conceive the vast ages or eras of time requisite for the succession of these phenomena in which all these populations were developed in particular zones.

As regards the history of man, we need not occupy ourselves with these remote periods, we may take as a starting point the formation of the deposits of the tertiary period. These deposits, known as the Pliocene, are those in which for the first time, the mammal population contain the remains of such species as are *similar* to those now existing.

At the termination of the tertiary period commenced the diluvium. Now it was that we find the remains of animals similar to those which now exist, and some which are extinct. Did man live contemporaneous with the cave bear, the mammoth, and others like mammals?

The laws of the universe have never changed. The remotest star or sun, which is a million times the size of our planet, is governed by the identical laws which regulate our condition. Uniformity and consistence in the operations of nature show that every form of matter under like circumstances will re-exist, whether it be a crystal, a plant, or a mammoth.

The many alternate contractions, upheavings, and vast dismemberments of the entire earth's surface, having ages of comparative rest intervening in each of these epochs, the various conditions of vegetable and animal existence have been developed. Should the world tomorrow undergo another entire disruption so as again to destroy all life, the same inherent power, incidental to its particular condition, would again people the globe with the various races, each compatible to the zones especially fitted for their existence.

How many times the earth has been previously to the present inhabited and repopled, it is impossible to even form a conjecture. It, however, may be admitted as a fact that it only requires a specific condition whether electrical, caloric, or chemical, we are sure to have a definite effect. The great convulsions of the world are accompanied by conditions perfectly adequate to produce every form of life with which we are cognisant. No one who is not intellectually blind, but must have observed the remarkable adaptation to locality which every form of life possesses, from the minutest animalculæ, 187 millions of whom only weigh one grain, to the development of the highest form of life, is exhibited in man of the temperate zones.

The discovery of human fossils has now become so frequent that no one who has taken the trouble to carefully investigate the facts will attempt to dispute that man did really exist at an ante-historic period, and coeval with extinct mammals.

My dear friend Dr. Morton of Philadelphia, said, in 1850 :—

“There is no good reason for doubting the existence of man in the fossil state. We have already several well authenticated cases, and we are hourly looking for more, even from the upper stratified rocks. Why may we not discover them in the tertiary deposits, and in the cretaceous beds, or even in the oolites. Contrary to all preconceived opinions, the latter strata have already afforded the remains of several marsupial animals, which have surprised geologists almost as much as if they discovered the bones of man himself.”

A fossil human skeleton is in the museum at Quebec ; it was dug out of the solid schist rock in making the foundations for the Citadel. This specimen I have examined, and it corresponds in structure to the fossil bones of extinct mammalia.

To revert to the “coprolite jaw,” it was found under circumstances which do not admit of a doubt, but no artificial means could have been employed so as to cause the permeation of the oxide of iron ; besides the other peculiarities of the jaw itself, all go to prove most conclusively to my mind that it belonged to a prehistoric human being, whose head was swallowed by a huge carnivore, and the jaw was excremented with other matters, the ducts of digestion.

The coprolites are unquestionably the excrementary deposition of animals who lived on sharks and whales, as we discover immense quantities of the teeth of the former and the bones of the ear of the latter, besides undigested bones of fish are discovered in many of the coprolites.

The “old woman’s jaw” has had her revenge.

With true philosophic spirit, and consistent with the high character of a gentleman in the strictest sense, Professor Busk sent me the following :—

“15, Harley Street, August 19th, 1863.

“MY DEAR SIR,—I have received the jaw from Dr. Falconer, and now forward it to you, with many thanks for the liberal use you have allowed us to make of it. I hope you will not consider that it has been much injured by the rough treatment we have submitted it to. In all essential respects it is much as it was, and it has been a great satisfaction to be able to compare its interior as well as exterior with other bones. Having thus had an opportunity of fully examining the bone, I have considerably modified the opinion I hastily expressed at the Ethnological Society. That is to say, it is *very different* from an ordinary churchyard bone, though, of course, without any relation as regards age with the fossil bones of the coprolite beds ; it is of *very*

great antiquity, and it is peculiarly remarkable for the great amount of iron it contains, though still retaining about 8 per cent. of animal matter. On the whole, therefore, though not of the portentous antiquity it would have claimed, had it been cotemporary of *Elephas meridionalis*, the "coprolite jaw" fairly claims a considerable age, and I, for one, am much obliged to you for having brought it under notice, and for the liberal way in which you have allowed it to be examined.

"Believe me, very truly,

"GEORGE BUSK.

"R. H. Collyer, Esq., M.D."

Nothing more could be expected from Professor Busk; when he says the coprolite jaw is of very great antiquity, he admits the whole question.

I have now the pleasure to add a letter from Mr. John Taylor, which completes the history of this really extraordinary specimen:—

"97, Fore Street, Ipswich, November 13th, 1866.

"DEAR DOCTOR,—I was very agreeably surprised to hear from you this morning. If I had known you were residing in Boulogne-sur-Mer, and had possession of 'the jaw,' I would have called upon you on my way to the Pyrenees last year, in order to have had another good look at the bone, which certainly must be of the same age as the coprolite in which it was found.

"The history of the matter, so far as I know, is very short.

"From what I could learn at the time, from the agricultural labourer of whom I bought it, it came from the coprolite pit on the farm of Mr. Laws at Foxhall, about four miles from Ipswich, and was thrown out at Mr. Packard's manure factory with the coprolite from a cart or tumbril, and from thence was brought to me to secure a glass of beer. I had possession of it for near three months, when Sir Thos. Beaver (whose son was then living with me) called on me, and seeing that he exhibited great interest in the inquiry as to the antiquity of the jaw, I had the pleasure of presenting him with it.

"There is no doubt the bone was obtained at some depth,* as I know the pit had been open for a considerable time when it was found.

"Having given you all the information I possess, I shall be anxious to hear the result of the investigation.

"The account of the 'Abbeville jaw' appeared in the *Times*, and I suppose yours of this jaw will also.

"Yours very truly,

"J. TAYLOR.

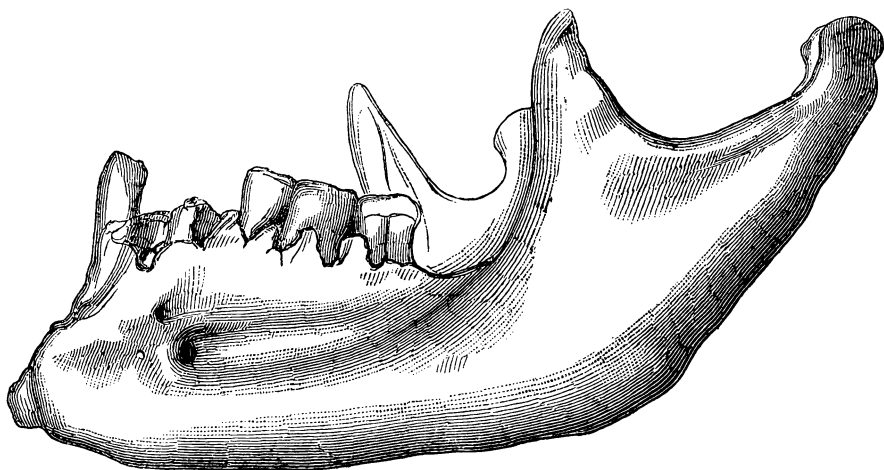
"Dr. Collyer."

It will be observed that Foxhall, where the "coprolite jaw" was found, is a few miles from Kyson, where Sir C. Lyell says the first example of a fossil quadrumanous animal was discovered in Great Britain,

* I visited the coprolite pit in 1855, immediately after it was found, and ascertained that it had been worked for over a year. The place from which "the jaw" in all probability came, was sixteen feet below the surface.

namely, the teeth and part of the jaw of a monkey, of the genus *Macacus*. The eocene strata, in the vicinity of Woodbridge and Ipswich, are exceedingly rich in animal remains of a prehistoric condition of the world. I see no reason whatever for doubting the antiquity of the "coprolite jaw."

These facts should at least make the sceptical pause, on the probability that man may be no exception to the rest of creation.



THE ANTHROPOLOGICAL CONGRESS OF 1867.

IN the year 1865, a Congress for Archaic Anthropology was held at La Spezzia, and in 1866 at Neufchâtel. This year it is to be held at Paris, on the 17th of August. The following are the rules of the Congress:—

"The Congress cannot be held twice successively in the same country.

"All persons desirous of becoming members, who have paid their annual subscription (quota) are entitled to receive the publications of the Congress.

"At the end of each session, the Congress decides upon the locality where the next meeting is to take place; it also elects from the *savants* resident in the country fixed upon, the President of the ensuing session. It also elects several other *savants*, who are charged to